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An Annotated Checklist of Avifauna diversity from Narmada Canal region, Ahmedabad-Kadi, Gujarat, India

Krutarth Raval*

ABSTRACT

The research was performed between June 2021 and January 2022 with the aim of evaluating the avifauna diversity in the Narmada Canal region, which is located between Ahmedabad and Kadi, Gujarat. This contour canal system encompasses both water and forest habitat that attracts a diverse group of bird species. A total of 80 species (17 orders, 43 families) of avifauna were recognized from which order Passeriformes had the most diversity, whereas Apodiformes, Bucerotiformes, Ciconiiformes, Podicipediformes, Psittaciformes, and Suliformes had the least. There are 77 species categorized as least concern, two species categorized as near threatened (*Threskiornis melanocephalus* and *Ciconia episcopus*), and one species categorized as vulnerable (*Sterna aurantia*). This study will offer baseline information on avifauna diversity and status for future management and conservation strategies in the Narmada Canal region.

Keywords: Diversity, Avifauna, Checklist, Birds, Narmada Canal, Gujarat.

1. INTRODUCTION

Avifauna is crucial to the creation of a sustainable ecosystem. They contribute to the ecosystem by being the greatest scavengers, predators, pollinators, and insects-pest controlling agents (Bensizerara et al., 2013; Pathan et al., 2014). They serve as inevitable bio-indicators of air quality, habitat quality, and the surrounding ecosystem (Sarkar et al., 2009; Singh et al., 2018). Nearly 10,787 species of birds (252 families from 40 orders) have been reported worldwide, with 1335 species from 113 families and 26 orders recorded from India, including 574 species from Gujarat (Praveen et al., 2020; Patel et al., 2021).

Forests and wetland ecosystems attract a high number of avifauna because they supply adequate habitats for most birds, particularly those that are linked with vegetation as well as water resources. For the majority of birds, trees near bodies of water are an important part of their life cycle (Koli, 2014). The long-term consequences of habitat degradation have frequently been explored

utilising changes in avifauna population diversity, their unique behaviour towards different ecosystems, and their reproduction cycle (Jha, 2021).

The selected region of the Narmada Canal is majorly covered by dense forest areas. It consists of all types of vegetation, including native tree species suitable for birds. The man-made riverine canal serves as a water and food source (benthic insects) for avifauna. The purpose of the present research is to learn about the avifaunal diversity in the Narmada Canal region near Ahmedabad, with the goal of providing baseline data by creating an avian species inventory for future studies and raising awareness about the need for conservation.

Study Area

The Narmada Canal is a Western Indian contour canal that transports water from the Sardar Sarovar Dam through Gujarat and eventually to Rajasthan. A part of which is selected for the potential presence of avifauna. The survey of observation of birds began from the Narmada Canal bridge located in Ahmedabad ($23^{\circ}07'40.1''\text{N}$ $72^{\circ}37'29.6''\text{E}$) and finished near the Kadi Dam region ($23^{\circ}14'37.2''\text{N}$ $72^{\circ}20'13.9''\text{E}$) (Fig. 1). This covered area consists of wetland and forest regions.

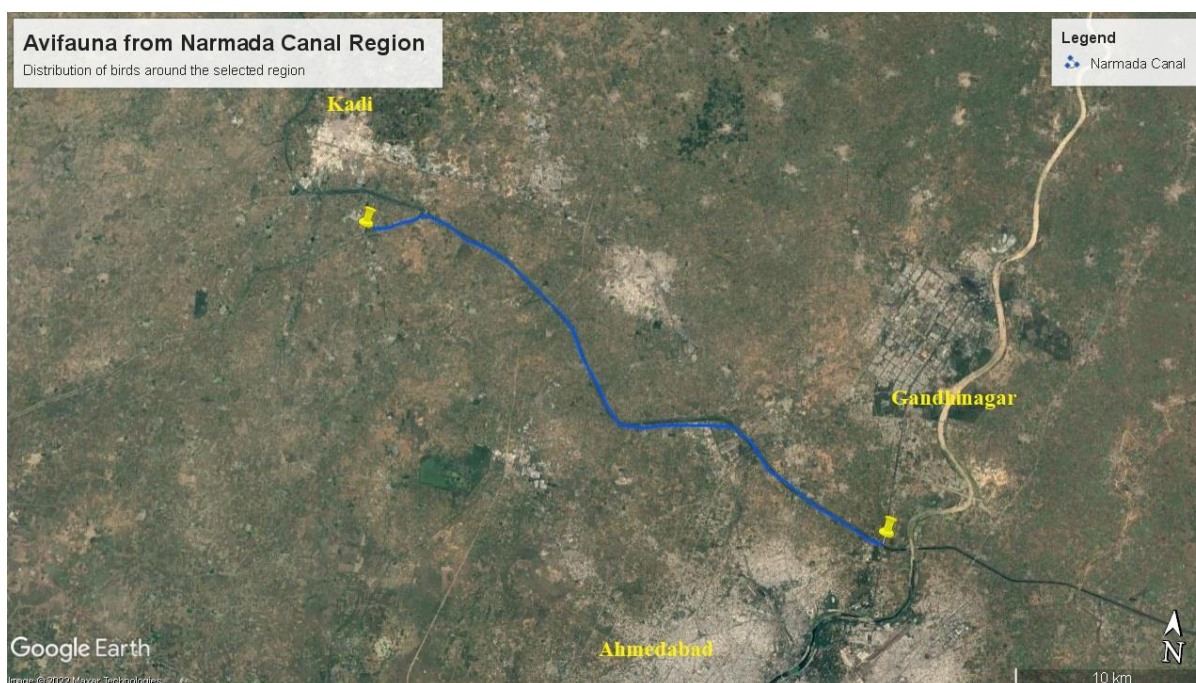


Figure 1. Map of study location

2. METHODOLOGY

The roving survey was conducted over the course of eight months, from June 2021 to January 2022, and covered both the monsoon and winter seasons. The observation of avifauna was conducted during the morning (06:00 – 10:00 hours) and evening (16:00 – 18:00 hours) based on their hyperactivity of roosting as well as foraging. Random sighting and point observation procedures were used to survey the birds. Avifaunal sightings were performed using a Nikon Aculon binocular, 10 x 42 mm. The observed birds were identified using the latest scientific papers and field manuals (Ali and Ripley, 1966; Ali, 1966; Grimmett et al., 2011). Each identified species is cross-referenced with its current IUCN status from e-version. (IUCN, 2022). The presence of avifauna was also reported based on their encounter as abundant (A) – > 100 , moderate (M) – > 50 , and rare (R) – < 10 .

3. RESULT AND DISCUSSION

According to the findings, the wetlands and forests in the Narmada Canal region have a high potential for supporting a diverse range of birds, including significant indicator species.

In this research, 80 avifauna species from 17 orders and 43 families were revealed (Table 1). This represents the extensive diversity of the avifauna community in the Narmada Canal area of Ahmedabad-Kadi, Gujarat. Based on the diversity, it is observed that the seniority of species was highest in the order Passeriformes (20 families & 38 species), followed by Charadriiformes (4 families & 4 species), Coraciiformes (3 families & 4 species), Pelecaniformes (2 families & 5 species) and Piciformes (2 families & 3

species). The rest of all the orders Podicipediformes, Psittaciformes, Suliformes, Cuculiformes, Galliformes, Gruiformes, Ciconiiformes, Columbiformes, Accipitriformes, Anseriformes, Apodiformes, Bucerotiformes contain one family in each, respectively (Fig. 2).

Table 1. Checklist of Avifauna of Narmada Canal region, Ahmedabad-Kadi, Gujarat.

Sr. No.	Common name	Scientific name	IUCN status	Abundance status
Order: Accipitriformes				
Family: Accipitridae				
1	Black Kite	<i>Milvus migrans</i>	LC	A
2	Shikra	<i>Accipiter badius</i>	LC	M
3	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	LC	R
4	Booted Eagle	<i>Hieraaetus pennatus</i>	LC	R
Order: Anseriformes				
Family: Anatidae				
5	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	LC	A
6	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	LC	A
7	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	LC	A
8	Green-winged Teal	<i>Anas crecca</i>	LC	M
Order: Apodiformes				
Family: Apodidae				
9	Little swift	<i>Apus affinis</i>	LC	A
Order: Bucerotiformes				
Family: Upupidae				
10	Eurasian Hoopoe	<i>Upupa epops</i>	LC	M
Order: Charadriiformes				
Family: Charadriidae				
11	Red-wattled Lapwing	<i>Vanellus indicus</i>	LC	A
Family: Laridae				
12	River Tern	<i>Sterna aurantia</i>	VU	A
Family: Recurvirostridae				
13	Black-winged Stilt	<i>Himantopus himantopus</i>	LC	A
Family: Scolopacidae				
14	Common Sandpiper	<i>Actitis hypoleucos</i>	LC	A
Order: Ciconiiformes				
Family: Ciconiidae				

15	Woolly-necked Stork	<i>Ciconia episcopus</i>	NT	R
Order: Columbiformes				
Family: Columbidae				
16	Rock Pigeon	<i>Columba livia</i>	LC	A
17	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	LC	A
18	Laughing Dove	<i>Streptopelia senegalensis</i>	LC	A
19	Yellow-footed Green-Pigeon	<i>Treron phoenicopterus</i>	LC	M
Order: Coraciiformes				
Family: Alcedinidae				
20	White throated kingfisher	<i>Halcyon smyrnensis</i>	LC	A
Family: Coraciidae				
21	European Roller	<i>Coracias garrulus</i>	LC	M
Family: Meropidae				
22	Green Bee-eater	<i>Merops orientalis</i>	LC	A
23	Blue-tailed Bee-eater	<i>Merops philippinus</i>	LC	A
Order: Cuculiformes				
Family: Cuculidae				
24	Common Hawk-Cuckoo	<i>Hierococyx varius</i>	LC	A
25	Asian koel	<i>Eudynamys scolopaceus</i>	LC	A
Order: Galliformes				
Family: Phasianidae				
26	Indian Peafowl	<i>Pavo cristatus</i>	LC	A
27	Gray Francolin	<i>Ortygornis pondicerianus</i>	LC	M
Order: Gruiformes				
Family: Rallidae				
28	Gray-headed Swampphen	<i>Porphyrio poliocephalus</i>	LC	M
29	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC	M
30	Eurasian Moorhen	<i>Gallinula chloropus</i>	LC	A
31	Eurasian Coot	<i>Fulica atra</i>	LC	M
Order: Passeriformes				
Family: Motacillidae				
32	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	LC	A
33	Paddyfield pipit	<i>Anthus rufulus</i>	LC	M
34	White Wagtail	<i>Motacilla alba</i>	LC	M
Family: Acrocephalidae				
35	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	LC	M

Family: Campephagidae				
36	Small Minivet	<i>Pericrocotus cinnamomeus</i>	LC	M
Family: Cisticolidae				
37	Common Tailorbird	<i>Orthotomus sutorius</i>	LC	A
38	Gray-breasted Prinia	<i>Prinia hodgsonii</i>	LC	A
39	Plain Prinia	<i>Prinia inornata</i>	LC	A
40	Ashy Prinia	<i>Prinia socialis</i>	LC	A
Family: Corvidae				
41	Rufous Treepie	<i>Dendrocitta vagabunda</i>	LC	A
42	House crow	<i>Corvus splendens</i>	LC	A
43	Large billed crow	<i>Corvus macrorhynchos</i>	LC	A
Family: Dicruridae				
44	Black Drongo	<i>Dicrurus macrocercus</i>	LC	A
Family: Estrildidae				
45	Indian Silverbill	<i>Euodice malabarica</i>	LC	M
Family: Hirundinidae				
46	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	LC	R
47	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	LC	M
48	Barn Swallow	<i>Hirundo rustica</i>	LC	M
Family: Laniidae				
49	Bay-backed Shrike	<i>Lanius vittatus</i>	LC	R
Family: Leiothrichidae				
50	Jungle Babbler	<i>Argya striata</i>	LC	A
51	Large Gray Babbler	<i>Argya malcolmi</i>	LC	A
52	Common Babbler	<i>Argya caudata</i>	LC	A
Family: Muscicapidae				
53	Indian Robin	<i>Copsychus fulicatus</i>	LC	A
54	Oriental magpie robin	<i>Copsychus saularis</i>	LC	A
55	Red-breasted Flycatcher	<i>Ficedula parva</i>	LC	M
Family: Nectariniidae				
56	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	LC	M
57	Purple Sunbird	<i>Cinnyris asiaticus</i>	LC	M
Family: Passeridae				
58	House sparrow	<i>Passer domesticus</i>	LC	M
Family: Phylloscopidae				
59	Greenish Warbler	<i>Phylloscopus trochiloides</i>	LC	R
Family: Pycnonotidae				
60	Red-vented Bulbul	<i>Pycnonotus cafer</i>	LC	A
61	White eared bulbul	<i>Pycnonotus leucotis</i>	LC	A
Family: Rhipiduridae				
62	White-browed Fantail	<i>Rhipidura aureola</i>	LC	M
Family: Sturnidae				
63	Bank Myna	<i>Acridotheres ginginianus</i>	LC	A

64	Rosy Starling	<i>Pastor roseus</i>	LC	A
65	Common Myna	<i>Acridotheres tristis</i>	LC	A
66	Brahminy Starling	<i>Sturnia pagodarum</i>	LC	M
Family: Sylviidae				
67	Lesser Whitethroat	<i>Curruca curruca</i>	LC	M
Family: Vangidae				
68	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	LC	A
Family: Zosteropidae				
69	Indian White-eye	<i>Zosterops palpebrosus</i>	LC	R
Order: Pelecaniformes				
Family: Ardeidae				
70	Cattle Egret	<i>Bubulcus ibis</i>	LC	A
71	Indian Pond-Heron	<i>Ardeola grayii</i>	LC	A
72	Little Egret	<i>Egretta garzetta</i>	LC	A
Family: Threskiornithidae				
73	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	NT	A
74	Red-naped Ibis	<i>Pseudibis papillosa</i>	LC	A
Order: Piciformes				
Family: Megalaimidae				
75	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	LC	M
Family: Picidae				
76	Yellow crowned woodpecker	<i>Leiopicus mahrattensis</i>	LC	R
77	Black-rumped Flameback	<i>Dinopium benghalense</i>	LC	R
Order: Podicipediformes				
Family: Podicipedidae				
78	Little Grebe	<i>Tachybaptus ruficollis</i>	LC	M
Order: Psittaciformes				
Family: Psittaculidae				
79	Rose-ringed Parakeet	<i>Psittacula krameri</i>	LC	A
Order: Suliformes				
Family: Phalacrocoracidae				
80	Little Cormorant	<i>Microcarbo niger</i>	LC	A
A - Abundant, M - Moderate, R - Rare; LC - Least Concern, NT - Near threatened, VU - Vulnerable, NA - Not Available				

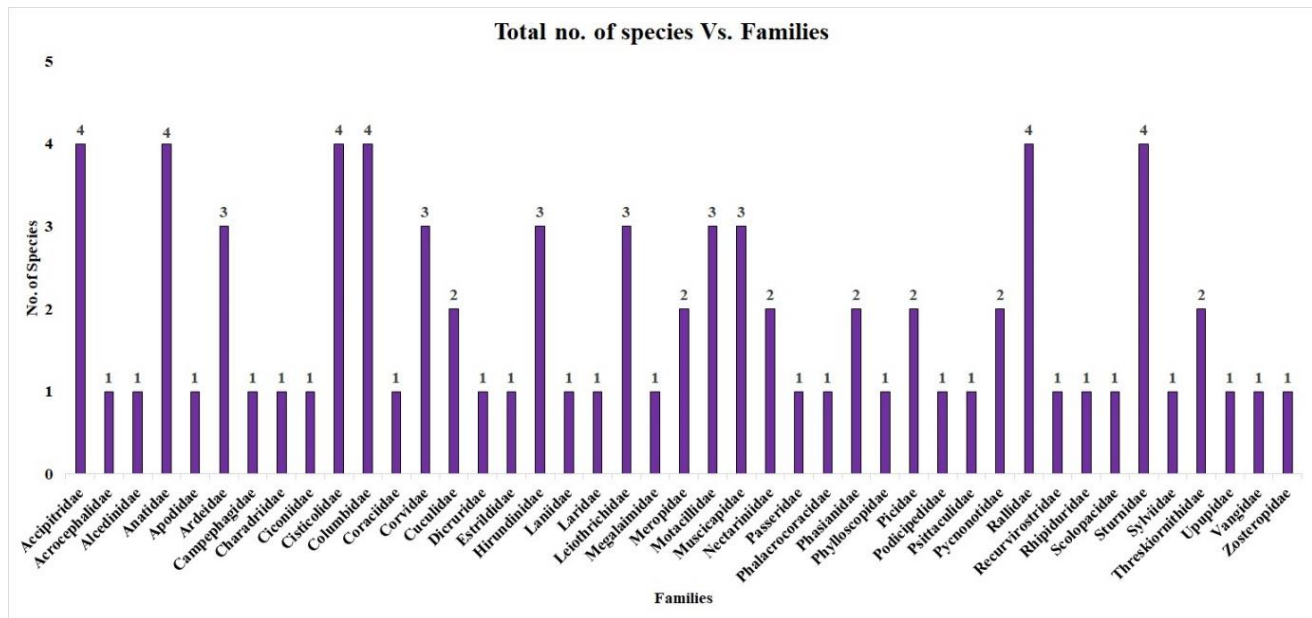


Figure 2. Status of avifauna family and species at the study area

From this generated checklist, a total of 77 species falls under the least concern (LC) category, 2 species (*Threskiornis melanocephalus* and *Ciconia episcopus*) under near threatened (NT) and 1 species (*Sterna aurantia*) in the vulnerable (VU) category of the IUCN list (Fig. 3). The avifaunal richness in terms of status, this region has 43 species that are abundant, 25 species that are moderate, and 9 species that are rare for this ecosystem (Fig. 4).

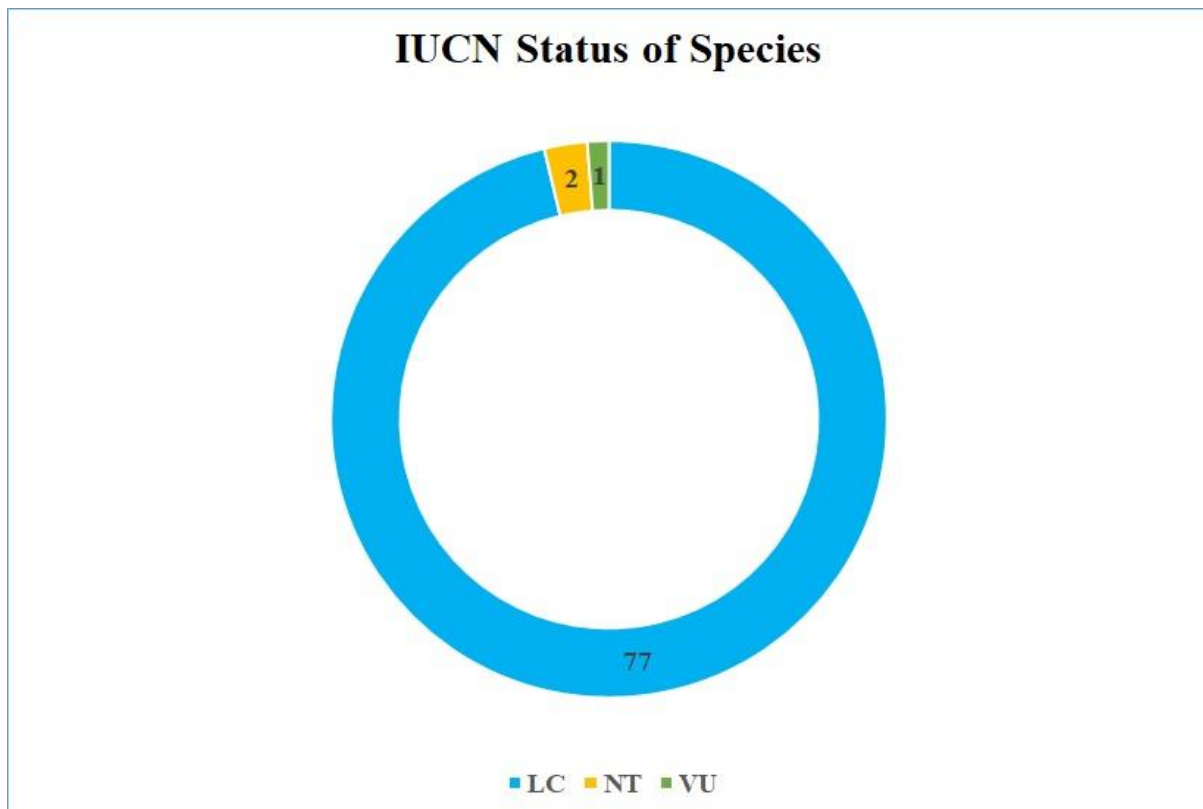


Figure 3. IUCN status of the avifauna species

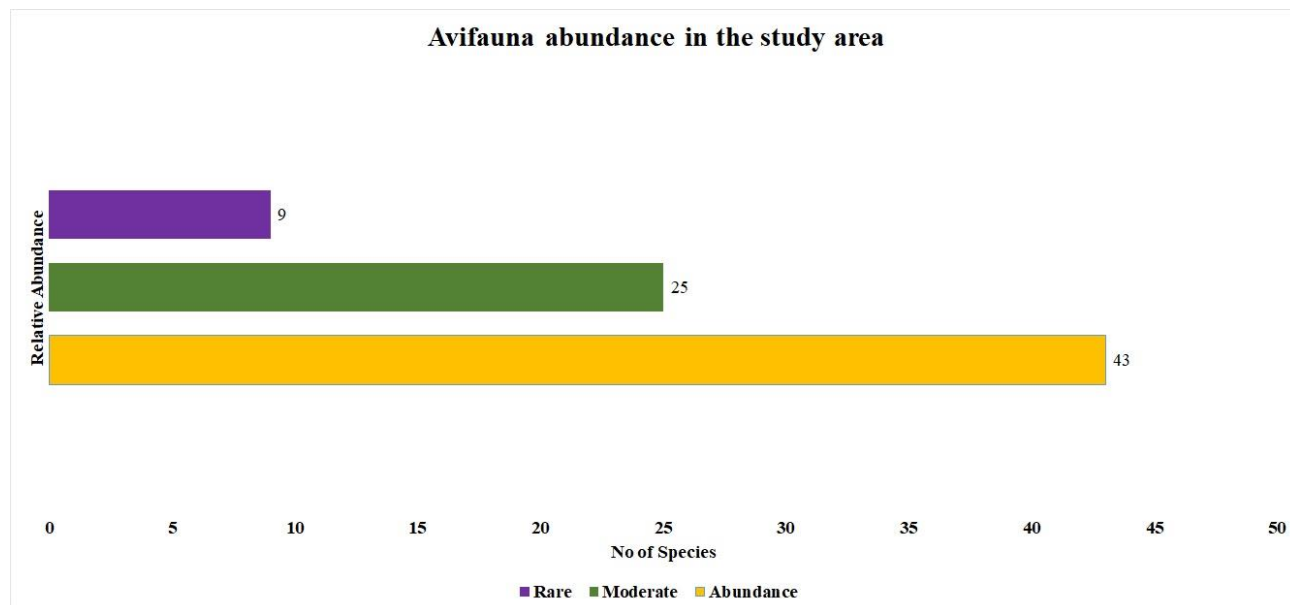


Figure 4. Abundance level of avifauna in the observed area

At Gujarat University in Ahmedabad, Jain et al. (2015) conducted a study in which 40 families and 85 species of avifauna were identified. Another study was undertaken at the Suhelwa wildlife sanctuary to look for the presence of birds, and it revealed 23 families with 95 species (Kushwaha et al., 2021). A bird checklist from Kheralu, Guajrat, was published with 66 families and 207 species included (Chaudhary et al., 2022). According to a survey conducted by Bangalore University, there are 19 families and 28 species of avifauna reported (Rajashekara and Venkatesha, 2017).

4. CONCLUSION

According to the current study, the Narmada Canal region is relatively safe and has an abundance of food resources with feasible ecosystem for the birds. The study suggests that different bird species live in various parts of the forest near the Narmada Canal. As a result, cautionary efforts should be made for conservation purposes, such as reducing construction activities. This is the first study of its kind to assess avifauna in the Narmada Canal region. This research also emphasizes the key of diversity studies in this region, which will ultimately aid in conservation. A bio-indicator can be assigned to a certain key species of the avifauna based on a comprehensive correlative analysis of air quality. The research also promotes periodic reports of the Narmada Canal system's avifaunal variety and the adjacent forested area.

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Ethical approval

The ethical guidelines are followed in the study for the observation of avifauna species. A total of 80 species (17 orders, 43 families) of avifauna species were recognized in the study from Narmada Canal region. Each identified species is cross-referenced with its current IUCN status from e-version.

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Conflicts of interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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